(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 132 884**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: 84201043.1

(22) Date of filing: 12.07.84

(51) Int. Cl.⁴: D 06 F 39/06

(30) Priority: 27.07.83 IT 2226883

(43) Date of publication of application:
13.02.85 Bulletin 85/7

(84) Designated Contracting States:
DE FR GB IT SE

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DE FR GB SE

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(54) Device for suppressing steam in domestic washing machines.

(57) To prevent the steam which arises during washing in the washing machine tub from becoming dispersed into the atmosphere by way of the drawer or other wash agent container (6), this latter is connected to the tub (1) by a syphon (11), so that the steam is unable to escape by this path because it is blocked by the plug of water which forms in the syphon. In addition, a vent pipe (42) is connected to the tub (1) and is at least partly water-cooled to allow at least partial condensation of the steam which necessarily passes to the outside through said pipe (42).

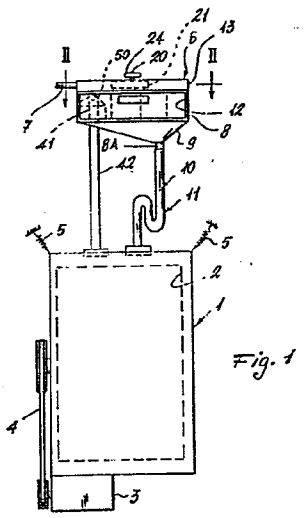

Fig. 1

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Device for suppressing steam in domestic washing machines.

This invention relates to a device for suppressing steam in domestic washing machines which comprise a drawer or similar container means for the wash agents, which is connected hydraulically to a tub in which the drum carrying the laundry is rotatably supported, and water delivery means associated with the drawer in order to discharge the wash agents into the tub through said hydraulic connection. Typical examples of these known constructions are described in Italian patent 863,531 and French patent 1,601,628.

During the washing of the laundry, a relatively high temperature is reached, leading to the emission of steam which passes from the tub to the outside by way of the hydraulic connection and the drawer. This steam emission is annoying, in the long term can damage the room in which the washing machine is installed, and in any case contributes to the agglomeration of the wash agent residues remaining in the drawer.

The object of the present invention is to effectively and largely suppress the steam which generates in the tub during washing, by the use of simple means.

This and further objects which will be more apparent from the detailed description given hereinafter are attained according to the invention by a device, which is characterized essentially in that a syphon is disposed in the hydraulic connection between the drawer and tub, and in that a steam vent pipe is provided connected to the tub, and is water-cooled over at least one portion so as to constitute a steam condenser.

According to a preferred embodiment of the invention, the vent pipe extends into the drawer itself, into a water-filled chamber which is situated in proximity to the water delivery means, so as to receive a fraction

thereof.

The invention will be more apparent from the detailed description given hereinafter by way of example and with reference to the figures of the accompanying drawing, in which :

Figure 1 is a diagrammatic partial side elevation of a washing machine incorporating the device according to the invention;

Figure 2 is a diagrammatic partial section on the line II-II of Figure 1;

Figure 3 is a diagrammatic section on the line III-III of Figure 2, to an enlarged scale;

Figure 4 is a diagrammatic section on the line IV-IV of Figure 2; and

Figure 5 is a detailed perspective exploded view showing the emergence of the vent pipe into the chamber which is occupied by the cooling water, and is situated in the drawer.

In the figures, the reference numeral 1 indicates the conventional tub of a washing machine. The drum 2, into which the laundry to be washed is placed, is cantilever-mounted rotatably inside the tub. The drum is driven by an electric motor 3 by way of a belt transmission 4. The tub is suspended from a load-bearing frame, not shown, by means of springs 5.

The washing machine comprises a device, indicated overall by 6 and for simplicity defined in the present description by the term "drawer", into which the wash agents (detergents, softeners etc.) are placed, and are discharged into the tub 1 by the water flowing from the water main through the pipe 7 and a solenoid valve, not shown.

In this example, the drawer 6 comprises a lower casing 8 possessing an inclined base 9 which converges towards a pipe stub 8A on which is mounted the end of a flexible pipe 10 which terminates on the tub 1, at a suitable aperture provided in the tub shell. In an intermediate position, the pipe 10 comprises a syphon 11, in

which a plug of water forms and remains, its purpose being to prevent the steam generated in the tub during washing from escaping outwards through the drawer 6. The drawer also comprises an extractable part 12 possessing a set of compartments 12a, b, c .... in which the washing agents used in the wash cycle are placed in their required quantities.

The lower casing 8 is closed upperly by a cover 13, which comprises a set of tubes 14a, b ...., which terminate above the compartments 12a, 12b .... and serve to feed these latter with the water necessary for removing the products used during washing (see Figure 2). At their other end, said tubes terminate in mutually aligned apertures (again see Figure 2) in front of which, and aligned therewith, are provided nozzles 15a, b, c ... provided on the stationary pipe 7, which is connected to the water main.

At one end of the cover there is provided a substantially cylindrical guide 16 (see Figure 3) which is in one piece with the cover and is provided with a longitudinal slot 17 facing the inlets of the tubes 14a, b .... The guide in question is open lowerly at 18 to allow water to discharge to the lower casing 8 and from here into the tub 1 through the pipe 10. The tubular guide 16 also upperly comprises a longitudinal slot 19 to allow the movement of a peg 20 associated with a distributor 21 which is slidably mounted in said guide 16. The distributor is of approximately cylindrical configuration, and comprises an outlet port 22 disposed in the slot 17 of the guide 16 in front of the mouths of the tubes 14a, b, c ... The distributor 21 also comprises side walls provided with a slot 23 in order not to interfere with the nozzles 15a, b ... or with the pipe 7 during its movements.

In order to obtain movement of the distributor 17 in the two directions of the arrows A of Figure 2, the peg 20 is disposed between the arms of a fork provided at the end of a lever 24 which is pivoted at 25 and is made to adhere, by means of a spring 26, to a cam 27 rigid

with the exit shaft 29 of the normal washing machine programmer (timer) 28. The distributor 21 can be operated in any other known manner, such as that described in Italian patent 863,831.

One or two nozzles 15a, b, c ... come into communication with one or two inlets of the pipes 14a, b, c... by way of the port 22, in accordance with the position assumed by the distributor 21 at any given time. The other nozzles, which do not face the port 22, discharge their water into the underlying casing 8, and part of this water reaches a lateral chamber 40, into which there extends the outlet stub 41 of a flexible vent pipe 42 connected to the tub 1.

Said chamber 40 is bounded by walls 43 rigid with the lower casing 8 of the drawer, and comprises an overflow edge 44 for discharging the excess water which reaches it when the water feed pipe 7 is opened.

The outlet stub 41 also forms a single piece with the lower casing 8 of the drawer, and on it there is disposed (Figure 5) a deflector member or angle plate indicated overall by 50 and provided lowerly with a series of elastic stems 51 which are disposed spaced-apart along a cylindrical surface and elastically clamp against the upper part of the outlet stub 41 in order to removably retain said angle plate 50 in situ. The angle plate comprises two substantially converging surfaces 52 and a rib 53, by which it can be gripped for its removal or its fitting to the end of the outlet stub 41. The purpose of the angle plate 50 is to deflect any still uncondensed steam leaving the outlet stub 41, towards and on to the surface of the water contained in the chamber 40 (see also Figure 4).

The operation is easily apparent from the aforegoing description. The water is fed, according to requirements, into the predetermined compartments 12a, b ... of the drawer 6, in accordance with the position of the distributor 21 relative to the fixed nozzles 15a, b ... Part of the water penetrates into the compartments, removes

the wash agents and is discharged from one end of said compartments, for example as shown in Figure 1 of French patent 1,601,628. On the inclined base 9 of the casing 8, this water containing the entrained wash agent meets the water from the other nozzles 15a, b, c ..., this latter having directly reached said base without passing through the compartments. A certain quantity of this latter water also enters the chamber 40 to replace that already present, and the excess of this water is discharged over the overflow edge 44 and on to the inclined base 9. All these water streams flow through the pipe 10 and syphon 11 and into the tub 1.

During those stages of the laundry wash cycle in which the heating of the water generates steam, this passes from the tub 1, through the vent pipe 42 and into the outlet stub 41, which because of the cooling effect of the water in the chamber 40 constitutes a steam condenser.

The uncondensed steam which emerges below the angle plate 50 is directed by this latter on to the free surface of the water contained in the chamber 40 (because of the converging inclined surface configuration of the angle plate), so that it is further suppressed. In this manner, there is substantially no escape of steam into the room in which the washing machine is situated.

1. A device for suppressing steam in domestic washing machines which comprise a drawer or similar wash agent container connected hydraulically to a tub in which the drum carrying the laundry is rotatably supported, and water delivery means associated with the drawer in order to discharge the wash agents into the tub through said hydraulic connection, characterized in that a syphon (11) is disposed in the hydraulic connection (10) between the drawer (6) and tub (1), and in that a steam vent pipe (42) is provided connected to the tub (1), and is water-cooled over at least one portion (in 41) so as to constitute a steam condenser.

2. A device as claimed in claim 1, characterized in that the vent pipe (42) terminates by way of an outlet stub (41) in a water chamber (40) which is provided in the drawer (6) and is fed by the delivery means (7, 15a, b, c ...).

3. A device as claimed in the preceding claims, characterized in that at the end of the outlet stub (41) of the vent pipe (42) there is removably disposed a deflecting angle plate (50) for guiding the steam leaving said pipe towards the water contained in the chamber (40).

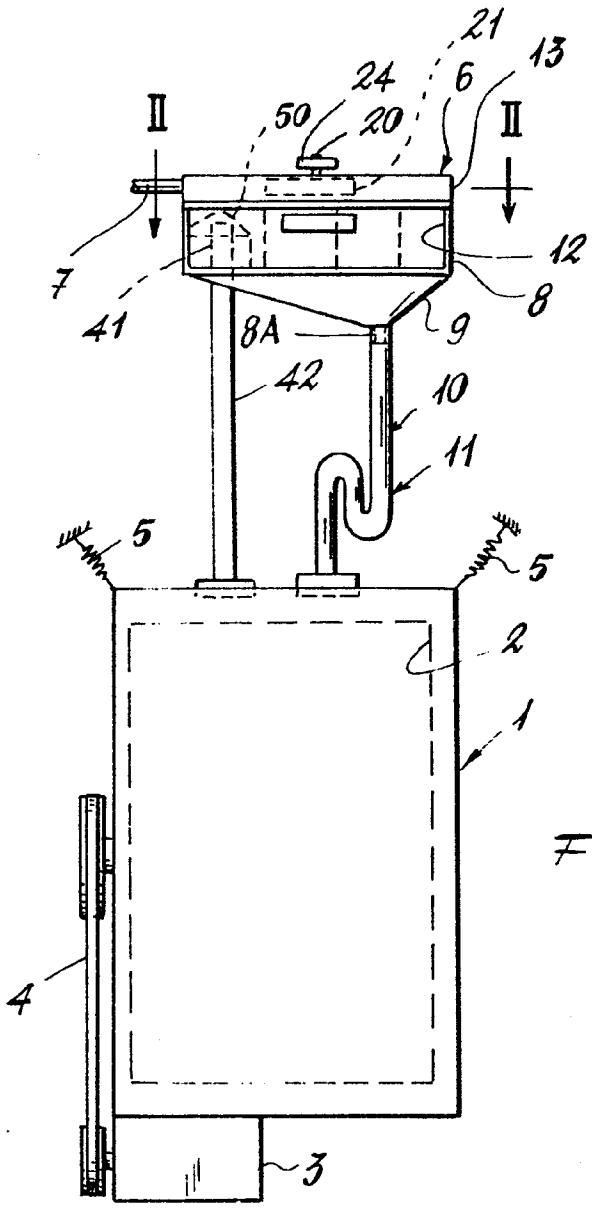

Fig. 1

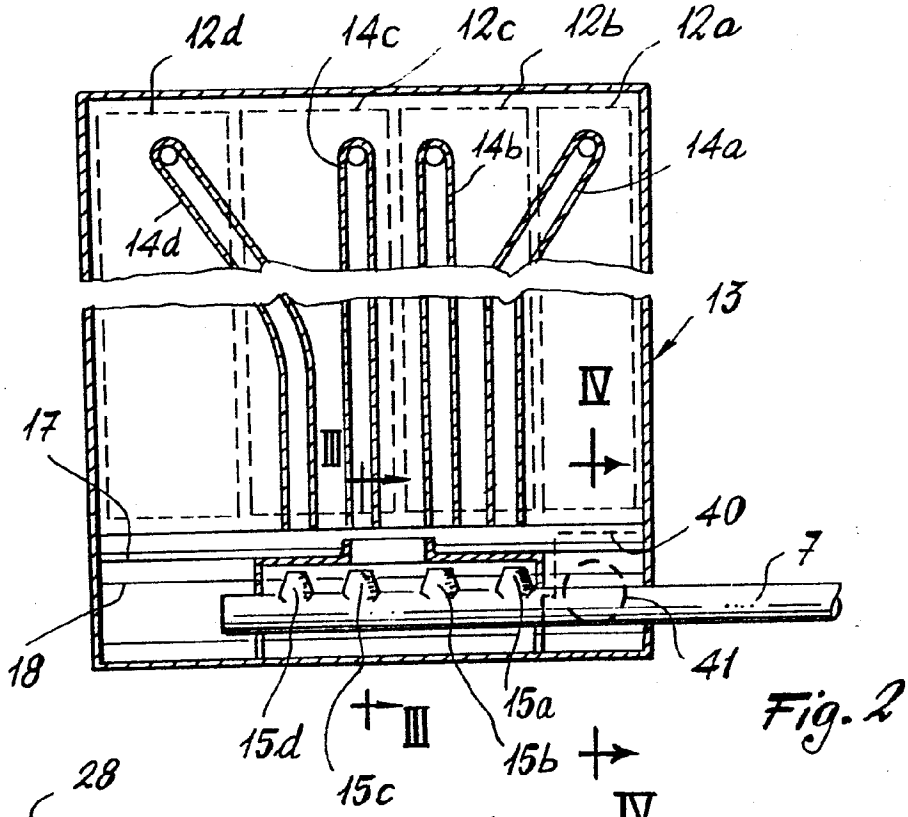

Fig. 2

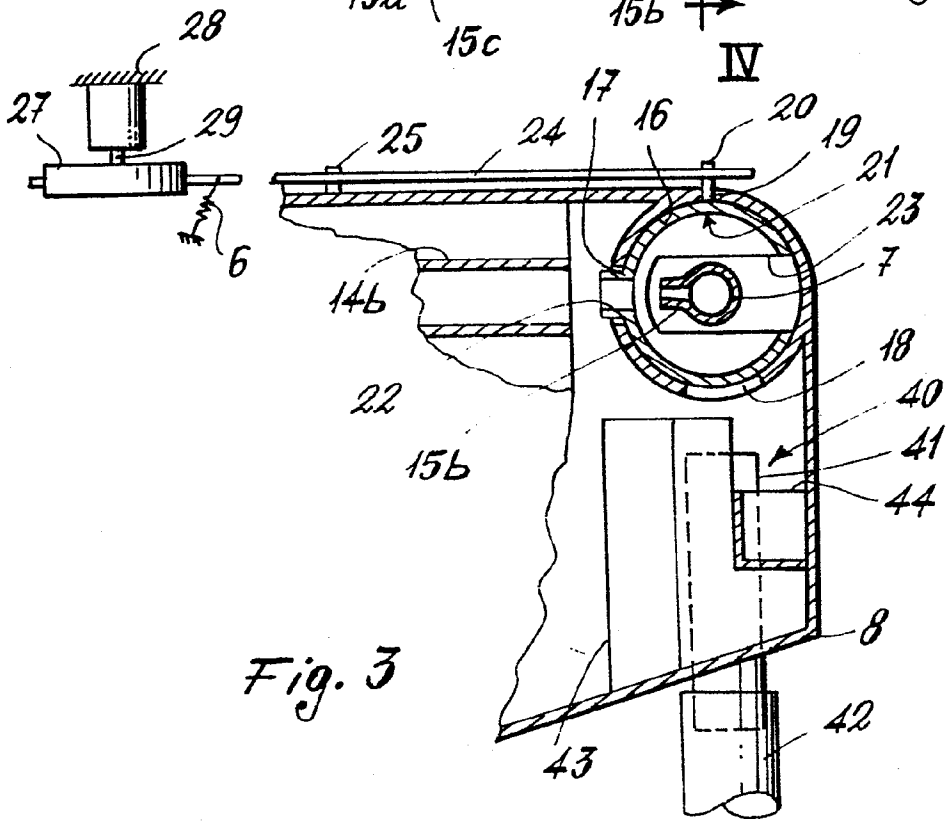

Fig. 3

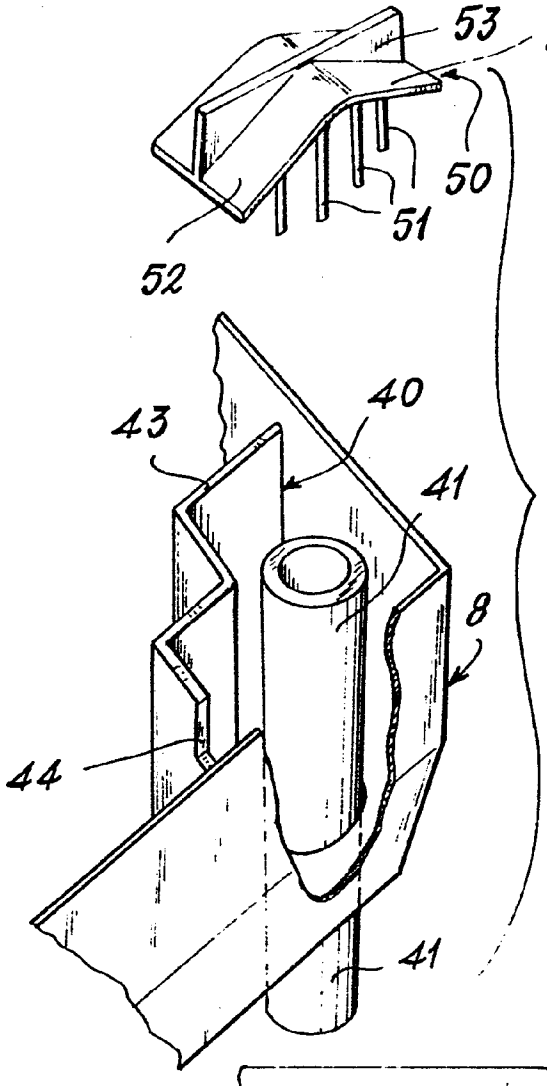

Fig. 5

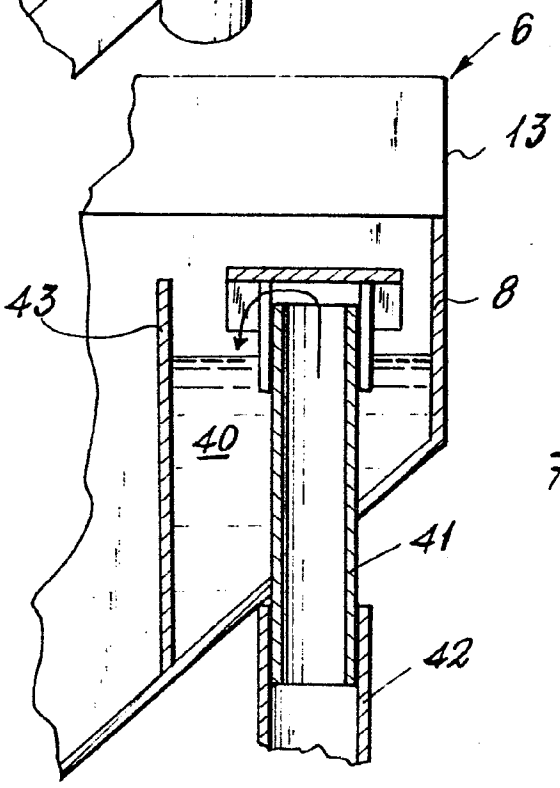

Fig. 4